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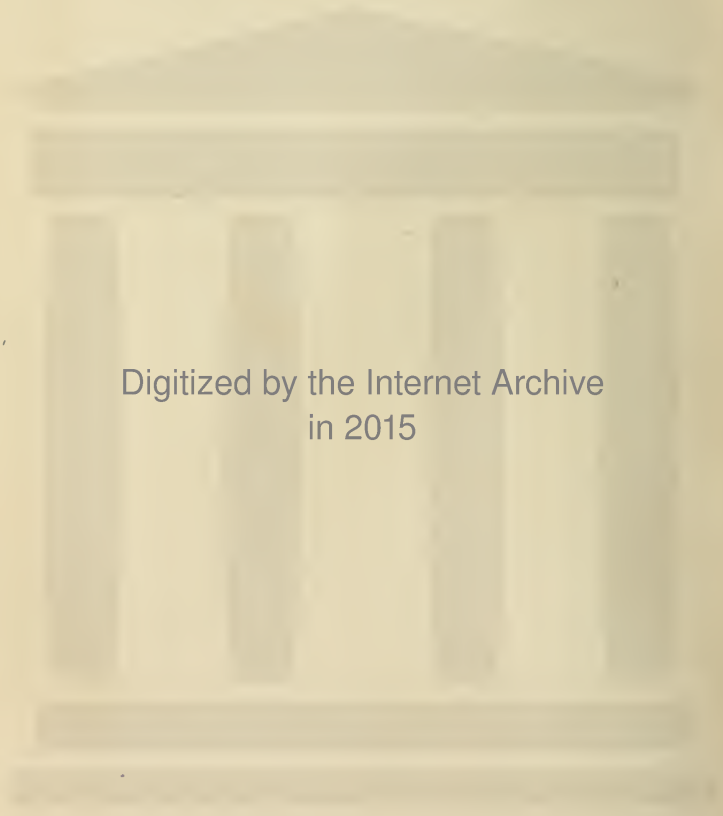
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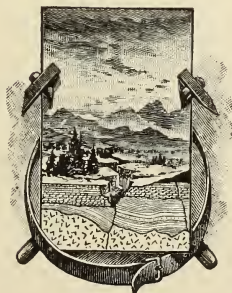
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEORGE OTIS SMITH, DIRECTOR

BULLETIN 444

BIBLIOGRAPHY
OF
NORTH AMERICAN GEOLOGY
FOR
1909
WITH SUBJECT INDEX

BY
JOHN M. NICKLES



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BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY FOR 1909, WITH SUBJECT INDEX.

By JOHN M. NICKLES.

INTRODUCTION.

The bibliography of North American geology, including paleontology, petrology, and mineralogy, for the year 1909 follows the plan and arrangement of its immediate predecessors, the bibliographies for 1906-7 and 1908 (Bulletins 372 and 409 of the U. S. Geological Survey). It includes publications bearing on the geology of the continent of North America and adjoining islands, also Panama and the Hawaiian Islands. Papers by American writers on the geology of other parts of the world are not included. Text-books and papers general in character by American authors are included; those by foreign authors are excluded unless they appear in American publications.

As heretofore, the papers, with full title and medium of publication and explanatory note when the title is not fully self-explanatory, are listed under the authors arranged in alphabetic order. The author list is followed by an index to the literature listed. In this index the entries, in one alphabet, are of three kinds—first, subject, with various subdivisions, to enable the specialist to ascertain readily all the papers bearing on a particular subject or area; second, titles of papers, many of them abbreviated or inverted, under their leading words; and third, cross references, which have been freely used to avoid too much repetition. The subjects have been printed in black-faced type, the titles of papers and cross references in ordinary type. As it may not be always obvious which subject headings have been adopted, a classified scheme of those used immediately precedes the index.

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794. Diamonds in Arkansas.—Abstract: Science, new ser., vol. 30, p. 127, July 23, 1909.

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798. Notes on the Bohemia mining district, Oregon.—*U. S. Geol. Survey, Bull.* 380, pp. 80-84, 1909.

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799. Notes on the economic geology of northern Idaho and northwestern Montana.—*U. S. Geol. Survey, Bull.* 384, pp. 92-108, 1909.

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801. Abstract of report on the Kananaskis coal lands [Alberta].—*Canadian Min. Jour.*, vol. 30, pp. 141-143, 1 fig., March 1, 1909.

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803. Development of petroleum in Nevada.—*Am. Min. Cong.*, 12th Ann. Session, *Rept. of Proc.*, pp. 418-422, 1909.

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804. The Ohio Copper Company, Bingham, Utah.—*Min. World*, vol. 30, pp. 345-348, 4 figs., February 20, 1909.

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806. Ozokerite in Utah.—*Min. and Sci. Press*, vol. 99, pp. 789-790, 1 fig., December 11, 1909.

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807. Explorations on the Churchill River and South Indian Lake.—*Canada, Geol. Survey, Summ. Rept.*, 1908, pp. 87-92, 1909.

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809. Placers of the Gold Hill district, Alaska.—*U. S. Geol. Survey, Bull.* 379, pp. 234-237, 1909.

810. Gold placers of the Innoko district, Alaska.—*U. S. Geol. Survey, Bull.* 379, pp. 238-266, 1909.

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Marrs, G. O.

815. The genesis of various types of ore deposits.—Min. Science, vol. 59, pp. 49-51, 10 figs., January 21, 1909.

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818. Gold mining at Grass Valley, California.—Min. World, vol. 31, pp. 823-825, 7 figs., October 23, 1909.

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820. The relation of geology to topography.—Am. Geog. Soc., Bull., vol. 41, no. 3, pp. 138-142, 2 figs., March, 1909.

821. The Malaspina glacier region of Alaska.—Jour. Geology, vol. 17, no. 7, pp. 664-666, 1 fig., 1909.

822. Geography at the University of Wisconsin.—Jour. Geography, vol. 8, no. 2, pp. 39-42, October, 1909.

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823. The Kingston earthquake.—Monthly Weather Review, vol. 35, no. 1, pp. 5-6, January, 1907.

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Mather, Kirtley F.

824. The age of the Licking Narrows at Black Hand, Ohio.—Denison Univ., Sci. Lab., Bull., vol. 14, pp. 175-187, 5 figs., April, 1909.

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826. Rye Valley gold mines, Oregon.—Min. and Sci. Press, vol. 99, p. 687, 1 fig., November 20, 1909.

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827. Water resources of the Blue Grass region, Kentucky; with a chapter on the quality of the waters, by Chase Palmer.—U. S. Geol. Survey, Water-Supply Paper 233, 223 pp., 3 pls., 6 figs., 1909.

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828. Notes on the clays of Florida.—U. S. Geol. Survey, Bull. 380, pp. 346-357, 1909.

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829. A preliminary report on the geology of Florida with special reference to the stratigraphy.—Florida State Geol. Survey, 2d Ann. Rept., pp. 25-173, 8 pls., 2 figs., 1 map, 1909.

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831. Débris tracks on the domes of the Yosemite region.—Abstract: Science, new ser., vol. 30, pp. 61-62, July 9, 1909.

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833. Phosphate deposits of South Carolina and New Brunswick.—New Brunswick Nat. Hist. Soc., Bull., no. 27 (vol. 6, pt. 2), pp. 121-126, 1909.

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834. The Carnivora and Insectivora of the Bridger basin, middle Eocene.—Am. Mus. Nat. Hist., Mem., vol. 9, pt. 6, pp. 289-567, 11 pls., 118 figs., 1909.

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838. Seventh annual meeting of the American Society of Vertebrate Paleontologists.—Science, new ser., vol. 29, pp. 194-198, January 29, 1909.

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839. On a skull of *Aptenodus* and skeleton of a new artiodactyl from the lower Oligocene of Wyoming.—Abstract: Science, new ser., vol. 29, p. 196, January 29, 1909.

Geological correlation through vertebrate paleontology by international cooperation. Correlation Bulletin, No. 1. Plan and scope.—See Osborn and Matthew, no. 918.

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840. A Pliocene fauna from western Nebraska.—Am. Mus. Nat. Hist., Bull., vol. 26, pp. 361-414, 27 figs., 1909. Abstract: Science, new ser., vol. 29, pp. 196-197, January 29, 1909.

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Mauritz, B.

Ueber Kalomel.—See Goldschmidt and Mauritz, no. 459.

Maury, Carlotta J.

841. A new connecting link in the genesis of Fulgur.—Am. Jour. Sci., 4th ser., vol. 27, p. 335, 1 fig., April, 1909.

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Mead, Walter J.

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Mead, W. J., and Martin, Lawrence.

843. Apparatus for topographic field work on models in the laboratory.—Jour. Geography, vol. 7, no. 9, pp. 209-211, May, 1909.

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844. A phase of ground water problems in the West.—Econ. Geology, vol. 4, no. 1, pp. 35-45, 2 figs., 1909.

845. Some desert watering places in southeastern California and southwestern Nevada.—U. S. Geol. Survey, Water-Supply Paper 224, 98 pp., 4 pls., 1909.

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846. Ground waters of the Indio region, California, with a sketch of the Colorado Desert.—U. S. Geol. Survey, Water-Supply Paper no. 225, 56 pp., 12 pls., 5 figs., 1909.

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849. A coal prospect on Willow Creek, Morrow County, Oregon.—U. S. Geol. Survey, Bull. 341, pp. 406-408, 1909.

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850. The skull and dentition of an extinct cat closely related to *Felis atrox* Leidy.—California, Univ., Dept. Geology, Bull., vol. 5, no. 20, pp. 291-304, 1 pl., 1909.

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851. The occurrence of strepsicerine antelopes in the Tertiary of northwestern Nevada.—California, Univ., Dept. Geol., Bull., vol. 5, no. 22, pp. 319-330, December, 1909.

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852. Santa Eulalia mines, Chihuahua.—Min. and Sci. Press, vol. 98, pp. 37-39, 2 figs., January 2, 1909; vol. 99, p. 119, July 24, 1909.

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854. A heretofore undescribed stony meteorite from Thomson, McDuffie County, Georgia.—Smithsonian Misc. Coll., vol. 52 (Quart. Issue, vol. 5, pt. 4), pp. 473-476, 2 pls., 1909.

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Merwin, H. E.

Alamosite, a new lead silicate from Mexico.—See Palache and Merwin, no. 931.

On connellite and chalcophyllite from Bisbee, Arizona.—See Palache and Merwin, no. 932.

Mexico, Instituto Geologico.

857. Catálogo de los temblores (macro y microseismos) sentidos en la República Mexicana, durante el primer semestre de 1909.—Mexico, Inst. Geol., Parerg., t. 3, no. 3, pp. 173-199, 1909.

A list of earthquakes and seismic shocks registered at the seismological station at Tacubaya, D. F., Mexico, during the first half of 1909.

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Millar, Austin Q.

858. The Arkansas diamond fields.—Min. and Sci. Press, vol. 99, p. 534, October 16, 1909.

Miller, Arthur M.

859. Evidence that the Appalachian and central coal fields were once connected across central Kentucky.—Abstract: Science, new ser., vol. 29, p. 624, April 16, 1909.

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860. Erosion intervals in the Tertiary of North Carolina and Virginia and their bearing upon the distribution of the formations.—Abstract: Science, new ser., vol. 29, p. 634, April 16, 1909.

Description of the Philadelphia district.—See Bascom and others, no. 74.

Description of the Trenton quadrangle, New Jersey-Pennsylvania.—See Bascom and others, no. 75.

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861. The various mining districts of Colorado.—Min. Science, vol. 57, pp. 462-464, 507-510, 532-534, 549-551, 10 figs.; vol. 58, pp. 128-130, 207-208, 228-229, 246-247, 14 figs., 1909.

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863. *Pavo californicus*, a fossil peacock from the Quaternary asphalt beds of Rancho La Brea.—California, Univ., Dept. Geology, Bull., vol. 5, no. 19, pp. 285–289, 1 pl., 1909.

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865. The pre-Cambrian rocks of Canada.—Abstract: Canadian Min. Jour., vol. 30, p. 647, November 1, 1909.

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866. Grenville-Hastings unconformity.—Abstract: Geol. Soc. America, Bull., vol. 19, pp. 539–540, 1909.

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870. Fossils from the glacial drift and from the Devonian and Mississippian near Meadville, Pennsylvania.—Carnegie Mus., Annals, vol. 5, pp. 480–487, 1909.

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871. Genesis of petroleum.—Min. and Sci. Press., vol. 99, p. 543, October 23, 1909.

872. Outcrop of ore bodies.—Min. and Sci. Press, vol. 99, p. 781, December 11, 1909.

Moffit, Fred H.

873. Mining in the Kotsina-Chitina, Chistochina, and Valdez Creek regions, Alaska.—U. S. Geol. Survey, Bull. 379, pp. 153–160, 2 figs., 1909.

Moffit, Fred H., and Knopf, Adolph.

874. Mineral resources of the Nabesna-White River district, Alaska.—U. S. Geol. Survey, Bull. 379, pp. 161–180, 1 pl., 1909.

Includes an account of the general geology.

Moffit, Fred H., and Maddren, A. G.

875. Mineral resources of the Kotsina-Chitina region, Alaska.—U. S. Geol. Survey, Bull. 374, 103 pp., 9 pls., 9 figs., 1909.

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Moodie, Roy L.

876. Vertebrate paleontology: The Lysorophidæ; Stegocephala; The Cotylosauria; The oldest known reptile; The age of the Gaskohle; *Bison occidentalis*; *Nectosaurus*; *Callibrachion*.—*Am. Naturalist*, vol. 43, pp. 116-124, February, 1909.

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877. The Carboniferous quadrupeds. Those of Kansas, Ohio, Illinois, and Pennsylvania in their relation to the classification of the so-called Amphibia and Stegocephala.—*Kansas Acad. Sci., Trans.*, vol. 22, pp. 239-247, 3 pls., 1909.

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Moore, Elwood S.

881. Iron range north of Round Lake [Ontario].—*Ontario, Bur. Mines, 18th Ann. Rept.*, vol. 18, pt. 1, pp. 154-162, 6 figs., 1909.

Gives an account of the geology of the region and the occurrence and character of iron deposits.

882. Bog iron on English River [Ontario].—*Ontario, Bur. Mines, 18th Ann. Rept.*, vol. 18, pt. 1, pp. 180-195, 7 figs., 1909.

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883. Geology of Onaman iron range area.—*Ontario, Bur. Mines, 18th Ann. Rept.*, vol. 18, pt. 1, pp. 196-253, 35 figs., 1909.

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884. The geology of the Lake Wendigokan region [Ontario].—*Canadian Inst., Trans.*, vol. 8, pt. 3, pp. 341-361, 5 figs., 1 map, April, 1909.

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885. Leipsigate gold mining district, Nova Scotia.—*Min. World*, vol. 30, pp. 309-312, 9 figs., February 13, 1909.

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Morsack, Cajetan.

886. Feldspar mining in Ontario.—*Eng. and Min. Jour.*, vol. 87, pp. 759-760, 1 fig., April 10, 1909.

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887. The Waverly formations of east central Kentucky.—*Jour. Geology*, vol. 17, no. 2, pp. 164-177, 2 figs., 1909.

Munn, Malcolm J.

888. Studies in the application of the anticlinal theory of oil and gas accumulation.—Econ. Geology, vol. 4, no. 2, pp. 141-157, 2 figs., 1909.

The discussion is based mainly upon structural and stratigraphic features of oil pools in the Sewickley quadrangle, Pennsylvania.

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Nason, Frank L.

890. Some phenomena of the folding of rock strata.—Econ. Geology, vol. 4, no. 5, pp. 421-437, 4 figs., 1909.

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Nelson, Gaylord.

891. Tripoli deposits at Seneca, Missouri.—Min. World, vol. 31, p. 552, September 11, 1909.

Newland, David H.

892. The Clinton ores of New York State.—Am. Inst. Min. Eng., Bull., no. 27, pp. 265-283, 5 figs., March, 1909.

Describes the distribution of the Clinton formation, the general structure of the beds, the occurrence of the iron ores, and their origin.

893. A peculiar landslip in the Hudson River clays.—New York State Mus., Bull. 133, pp. 156-158, 2 pls., 1 fig., 1909.

894. The mining and quarry industry of New York State: Report of operations and production during 1908.—New York State Mus., Mus. Bull. 152, 99 pp., 1909.

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Nicholas, Francis C.

895. A method for demonstrating ore formations.—Min. World, vol. 30, pp. 349-350, 4 figs., February 20, 1909.

Nickles, John M.

896. Bibliography of North American Geology for 1906 and 1907, with subject index.—U. S. Geol. Survey, Bull. 372, 317 pp., 1909.

897. Bibliography of North American Geology for 1908, with subject index.—U. S. Geol. Survey, Bull. 409, 148 pp., 1909.

Classified list of papers dealing with coal, coke, lignite, and peat contained in publications of the U. S. Geological Survey, except those on Alaska.—See Lee and Nickles, no. 749.

Nicol, John M.

898. Placers of Waldo, South Oregon.—Min. and Sci. Press, vol. 99, pp. 122-124, 2 figs., July 24, 1909.

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Nicolas, Frank J.

899. General index of the reports of the Bureau of Mines of Ontario, Volumes I to XVI (1891-1907). Toronto, 1909. 466 pp.

Nordenskjöld, Otto.

900. On the geology and physical geography of east Greenland.—Meddelelser om Grönland, H. 28, pp. 151-284, 6 pls., 33 figs., 1909.

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Nylander, Olof O.

902. Fossil and living shells found in Little Mud Lake, Westmanland, Aroostook County, Maine.—Nautilus, vol. 22, pp. 105-106, February, 1909.

Nyström, Erik, and Anrep, S. A.

903. Investigation of the peat bogs and peat industry of Canada during the season 1908-9.—Canada, Dept. Mines, Mines Branch, Bull. no. 1, 25 pp., 5 pls., 1909.

Obalski, J.

904. Mining operations in the Province of Quebec for the year 1908.—Quebec, Dept. of Colonization, Mines and Fisheries, 85 pp., 19 pls., 1909.
Includes notes on the occurrence of various mineral deposits.

Odendall, Leonhard.

905. Die Kupfererzlagertstätten in Nordamerika. Inaugural-dissertation, Rheinischen Friedrich-Wilhelms-Universität zu Bonn. Köln, 1909. 63 pp.

Describes the occurrence and characters of the principal copper deposits of the United States, Mexico, and Canada, and discusses the various types of deposits.

O'Harra, Cleophas C.

- Description of the Belle Fourche quadrangle, South Dakota.—See Darton and O'Harra, no. 312.

Ohio Geological Survey.

906. A geological map of Ohio. J. A. Bownocker, state geologist. Based on preceding maps by Newberry and Orton. Richmond-Lorraine boundary by Foerste and Morse; glacial boundary and shore of glacial Lake Erie (Lake Maumee) after Leverett. Scale, 8 miles to 1 inch, 1909.

Olcott, Theodore F.

907. A new species of *Teleoceras* from the Miocene of Nebraska.—Am. Jour. Sci., 4th ser., vol. 28, pp. 403-404, October, 1909.

Oldham, Richard Dixon.

908. The geological interpretation of the earth movements associated with the Californian earthquake of April 18th, 1906.—Geol. Soc., London, Quart. Jour., vol. 65, pt. 1, pp. 1-16, 5 figs., February, 1909.

Ontario, Bureau of Mines.

909. Visit [of the British Association for the Advancement of Science, Winnipeg Meeting, 1909] to Cobalt and Sudbury, August 17th to August 20th. Toronto, 1909. 31 pp., illus.

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General index of the reports of the Bureau of Mines of Ontario, Volumes I to XVI (1891-1907).—See Nicolas, F. J., no. 899.

Ordóñez, Ezequiel.

910. Physical and geological features of Mexico mining.—Min. World, vol. 31, p. 15, July 3, 1909.

Gives a general account of the physiography and geology of Mexico and the general mode of occurrence of ore deposits.

911. Le Metlacueyatl, Mexique.—Ann. Géog., Paris, ann. 18, pp. 356-361, July 15, 1909.

Describes the physiographic features and the kinds and disposition of volcanic rocks forming its surface.

Orton, Edward, jr.

912. The Mills moraine, with some general remarks on the glaciation of the Longs Peak region of Colorado.—Abstract: Science, new ser., vol. 29, pp. 751-752, May 7, 1909.

Osborn, Henry Fairfield.

913. Cenozoic mammal horizons of western North America, with faunal lists of the Tertiary Mammalia of the West.—U. S. Geol. Survey, Bull. 361, 138 pp., 3 pls., 15 figs., 1909.

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914. The epidermis of an iguanodont dinosaur.—Science, new ser., vol. 29, May 14, 1909.

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1083. Distribution of the nation's mineral wealth.—Am. Min. Congress, 11th Ann. Sess., Papers and Proc., pp. 247-250, 1909.

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1087. Soil survey of Daviess County, Indiana.—Indiana, Dept. Geology and Nat. Res., 33d Ann. Rept., pp. 343-357, 3 pls., 1909.

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1098. Cretaceous geology of the Carolinas and Georgia.—*Abstract: Science*, new ser., vol. 30, pp. 124-125, July 23, 1909.

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1099. The life of a fossil hunter. New York, Henry Holt and Company, 1909. 286 pp., 1 pl. (port.), and 46 figs.

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1110. Coal fields of West Virginia.—Mines and Minerals, vol. 29, pp. 219-222, 283-287, 303-307, 6 figs., 1909.

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Storms, William H.

1116. Geology of the Yellow Aster mine, Kern County, California.—Eng. and Min. Jour., vol. 87, pp. 1277-1280, 3 figs., June 26, 1909.

1117. Great gold belt in Amador County, California.—Min. World, vol. 31, pp. 263-266, 4 figs., July 31, 1909.

1118. Consolidation of Mother Lode mines [California].—Min. and Sci. Press, vol. 99, pp. 597-598, 2 figs., October 30, 1909.

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1119. Description of the Mercersburg-Chambersburg district, Pennsylvania.—U. S. Geol. Survey, Geol. Atlas U. S., Mercersburg-Chambersburg folio (no. 170), library edition, 19 pp., 8 pls. (maps, sections, and illustrations sheets), 5 figs., 1909; field edition, 144 pp., 6 folded maps, 10 pls., 4 figs., 1910.

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1128. Mineral resources of Newfoundland.—*Min. Jour.*, London, vol. 87, pp. 167–169, October 30, 1909.

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1130. Grahamite deposits of southeastern Oklahoma.—*U. S. Geol. Survey, Bull.* 380, pp. 286–297, 1 fig., 1909.

1131. Ice-borne boulder deposits in mid-Carboniferous marine shales.—Abstract: *Science*, new ser., vol. 29, p. 637, April 16, 1909.

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1152. The Miami-Inspiration ore zone [Globe district, Arizona].—*Min. and Sci. Press*, vol. 99, pp. 646–658, 7 figs., November 13, 1909.
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1153. Copper deposits of Silverbell, Arizona.—*Min. and Sci. Press*, vol. 99, pp. 710–712, 4 figs., November 27, 1909.
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1157. Mining on the Mother Lode [California].—*Min. and Sci. Press*, vol. 98, pp. 40–41, 2 figs., January 2, 1909.
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1158. The Silurian section at Arisaig, Nova Scotia. With a correlation note by Charles Schuchert.—*Am. Jour. Sci.*, 4th ser., vol. 28, pp. 143–164, August, 1909.
Reviews previous work on the section describes the location, structure, petrology, mode of deposition, and subdivisions, and gives a detailed account of the various horizons, with lists of fossils.

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The geological distribution of the Mesozoic and Cenozoic Echinodermata of the United States.—See Clark and Twitchell, no. 238.

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1159. Mineral veins in the Montreal district [Ontario].—*Canadian Min. Jour.*, vol. 30, pp. 149–150, March 1, 1909.

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1160. Gypsum on Cape Breton Island, Nova Scotia.—Eng. and Min. Jour., vol. 88, pp. 569–570, 1 fig., September 18, 1909.

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1161. Geological classification of the waters of Illinois.—Illinois State Geol. Survey, Bull. no. 10, pp. 8–21, 1 fig., 1909.

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1162. Coal deposits and possible oil field near Duquoin, Illinois.—Illinois State Geol. Survey, Bull. no. 14, pp. 254–262, 1909.

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1163. Coal deposits and oil field near Duquoin, Illinois.—Min. World, vol. 30 pp. 487–489, 1 fig., March 13, 1909.

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1164. Untersuchung einiger Gesteine aus dem nordöstlichsten Labrador.—Ver. Erdk., Dresden, Mitt., Heft 8, pp. 230–236, 1909.

Describes rocks collected in northeastern Labrador (see Hantzsch, no. 508).

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1165. Ordovician paleogeography.—Abstract: Science, new ser., vol. 29, pp. 199–200, January 29, 1909.

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1166. Revision of the Paleozoic systems in North America.—Abstract: Science, new ser., vol. 29, p. 630, April 16, 1909.

1167. Paleozoic erosion channels.—Abstract: Science, new ser., vol. 30, pp. 973–974, December 31, 1909.

Gives a classification of erosion channels and describes examples from Ordovician and later Paleozoic deposits.

United States Geological Survey.

1168. The publications of the United States Geological Survey. Washington, 1909. 86 pp.

1169. Contributions to economic geology, 1908. Part I. Metals and nonmetals, except fuels.—U. S. Geol. Survey, Bull. 380, 406 pp., 2 pls., 32 figs., 1909.

The papers in this bulletin have been entered under the individual authors. Interpersed are lists of the Survey publications on various economic products.

1170. Mineral resources of the United States. Calendar year, 1908. Part I. Metallic products, 816 pp., 2 pls. (maps, in pocket), 3 figs., 1909. Part II. Nonmetallic products, 899 pp., 1 pl. (map, in pocket), 6 figs., 1909.

Contains the following papers, mainly statistical in character, relating to the production, condition of the industry, etc., but also in some cases including notes on the geology and occurrence of the products treated:

PART I.

Summary of mineral production in the United States in 1908, compiled by W. T. Thom, pp. 7–59.

Iron ores, pig iron, and steel, by E. C. Harder, pp. 61–134.

Manganese ores, by E. C. Harder, pp. 135–156.

Gold and silver, by Waldemar Lindgren and H. D. McCaskey, pp. 157–183.

Copper, by B. S. Butler, pp. 185–226.

Lead, by C. E. Siebenthal, pp. 227–243.

United States Geological Survey—Continued.

- Zinc, by C. E. Siebenthal, pp. 245-273.
 Gold, silver, copper, lead, and zinc in the United States, pp. 275-276.
 Gold, silver, copper, lead, and zinc in the Western States, pp. 277-586.
 Silver, copper, lead, and zinc in the Central States, pp. 587-643.
 Gold, silver, copper, lead, and zinc in the Eastern States, by H. D. McCaskey, pp. 645-681.
 Quicksilver, by H. D. McCaskey, pp. 683-695.
 Bauxite and aluminum, by W. C. Phalen, pp. 697-708.
 Antimony, by Frank L. Hess, pp. 709-711.
 Bismuth, by Frank L. Hess, pp. 713-714.
 Selenium, by Frank L. Hess, pp. 715-717.
 Tellurium, by Frank L. Hess, pp. 719-720.
 Tungsten, nickel, cobalt, vanadium, etc., by Frank L. Hess, pp. 721-749.
 Chromic iron ore, by E. C. Harder, pp. 751-770.
 Tin, by Frank L. Hess, pp. 771-779.
 Platinum, by David T. Day, pp. 781-791.
 Cadmium, by C. E. Siebenthal, pp. 793-803.

PART II.**FUELS.**

- Coal, by E. W. Parker, pp. 5-211.
 Coal, briquetting, by E. W. Parker, pp. 213-221.
 Coke, by E. W. Parker, pp. 223-283.
 Gas, coke, tar, and ammonia, by E. W. Parker, pp. 285-316.
 Natural gas, by B. Hill, pp. 317-344.
 Petroleum, by David T. Day, pp. 345-440.

STRUCTURAL MATERIALS.

- Cement industry in the United States in 1908, by E. C. Eckel, pp. 441-453.
 Clay-working industries, by Jefferson Middleton, pp. 455-504.
 Glass sand, other sand, and gravel, by A. T. Coons, pp. 505-510.
 Lime, by A. T. Coons, pp. 511-515.
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ABRASIVES.

- Abrasive materials, by W. C. Phalen, pp. 581-598.

CHEMICAL MATERIALS.

- Arsenic, by F. L. Hess, pp. 599-601.
 Borax, by C. G. Yale, pp. 603-605.
 Fluorspar and cryolite, by E. F. Burchard, pp. 607-620.
 Gypsum, by E. F. Burchard, pp. 621-628.
 Phosphate rock, by F. B. Van Horn, pp. 629-642.
 Salt and bromine, by W. C. Phalen, pp. 643-657.
 Sulphur and pyrite, by W. C. Phalen, pp. 659-668.

PIGMENTS.

- Barytes and strontium, by E. F. Burchard, pp. 669-673.
 Mineral paints, by E. F. Burchard, pp. 675-696.

MISCELLANEOUS.

- Asbestos, by J. S. Diller, pp. 697-706.
 Asphalt, related bitumens, and bituminous rock, by J. A. Taff, pp. 707-715.
 Graphite, by E. S. Bastin, pp. 717-738.
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 Mica, by D. B. Sterrett, pp. 743-754.
 Mineral waters, by S. Sanford, pp. 755-790.
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- Describes physical features of the State of Yucatan, Mexico. Includes notes on the geology.

1174. Notas sobre la caverna de Cacahuamilpa, Distrito de Alarcon, Estado de Guerrero.—Soc. Geol. Mexicana, Bol., t. 5, pp. 11-12, 151-155, 3 pls., 1909.

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1175. Nota acerca de unos supuestos yacimientos de cobre y de yeso en el partido de Champoton (Estado de Campeche).—Soc. Geol. Mexicana, Bol., t. 6, pp. viii, 15-16, 1 pl., 1909.

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1176. Report on an exploration journey to Shining Mountain in the Labrador Peninsula.—Quebec, Dept. of Colonization, Mines, and Fisheries, Mining Operations, 1908, pp. 32-49, 7 pls., 1909.
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1179. The phosphate deposits of the United States.—U. S. Geol. Survey, Bull. 394, pp. 157-171, 1909. Rept. Nat. Conservation Comm. (60th Cong., 2d sess., Sen. Doc. no. 676), vol. 3, pp. 558-570, 1909. Abstract: Min. and Sci. Press, vol. 99, pp. 88-90, 2 figs., July 17, 1909.

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1186. Los granitos de las canteras "Leahy," "Red Stone," (New Hampshire) y "Bienvenue," (Maine) E. U. A.—Soc. Geol. Mexicana, Bol., t. 6, pp. ix–xi, 37–66, 18 pls., 1909.

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- Alabama, Butler County, pp. 437-465.
 Marion County, pp. 381-400.
 Talladega County, pp. 401-436.
- Arkansas, Conway County, pp. 753-771.
- California, Colusa area, pp. 927-972.
 Redding area, pp. 973-999.
 Siskiyou County, Butte Valley, pp. 1001-1014.
- Florida, Jefferson County, pp. 345-379.
- Idaho, Minidoka area, pp. 909-926.
- Indiana, Marion County, pp. 793-812.
- Louisiana, Winn Parish, pp. 557-589.
- Maryland, Easton area, pp. 121-163.
- Mississippi, Jasper County, pp. 525-556.
 Oktibbeha County, pp. 467-502.
 Prentiss County, pp. 503-523.
- Nebraska, North Platte area, pp. 813-836.
- New York, Dutchess County, pp. 31-79.
- North Carolina, Edgecombe County, pp. 249-269.
 Henderson County, pp. 227-247.
- North Dakota, McKenzie area, pp. 859-879.
 Morton area, pp. 837-858.
- Pennsylvania, Johnston area, pp. 81-120.
- South Carolina, Lee County, pp. 323-343.
 Oconee County, pp. 271-298.
 Sumter County, pp. 299-321.
- South Dakota, Bellefourche area, pp. 881-906.
- Tennessee, Giles County, pp. 773-791.
- Texas, Bastrop County, pp. 663-704.
 Brownsville area, pp. 705-732.
 Cooper area, pp. 733-752.
 Robertson County, pp. 591-640.
 Wilson County, pp. 641-662.
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- West Virginia, Middlebourne area, pp. 165-192.

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CLASSIFIED SCHEME OF SUBJECT HEADINGS.

1. GENERAL.

Associations, meetings; Addresses; History; Philosophy; Biography; Bibliography; Educational; Text-books.

Classification; Nomenclature; Cartography; Technique; Fieldwork; Surveys; Borings.

Geochemistry; Chemical analyses (list); Atmosphere.

Miscellaneous.

2. REGIONAL.

The States of the Union, Alabama, etc.; the Provinces of Canada, Alberta, etc.; Greenland; Mexico; the countries of Central America; the West Indies, and the single islands; the Hawaiian Islands.

3. ECONOMIC.

Ore deposits, origin; Contact phenomena.

Gold; Placers; Black sands; Silver; Quicksilver; Nickel; Cobalt; Copper; Lead; Zinc; Iron; Magnetite; Manganese; Tin; Aluminum; Bauxite; Antimony; Bismuth; Tungsten; Wolframite; Vanadium; Uranium; Carnotite ores; Molybdenum; Molybdenite; Titanium; Rutile; Platinum; Monazite; Rare earths; Tantalum; Selenium; Tellurium; Zircon.

Coal; Anthracite; Coke; Peat; Lignite; Bituminous rock; Natural gas; Petroleum; Oil shales; Asphalt; Albertite; Gilsonite; Grahamite; Ozokerite.

Stone; Building stone; Granite; Bluestone; Limestone; Lime; Marble; Onyx; Sandstone; Clay; Kaolin; Bentonite; Fire clay; Gneiss; Slate; Shale; Marl; Sand; Glass sand; Sand-lime brick; Gravel; Cement and cement materials; Concrete materials; Road materials; Trap; Steatite; Soapstone; Talc.

Precious stones; Diamonds; Sapphires; Turquoise; Tourmaline.

Abrasive materials; Corundum; Emery; Garnet; Diatomaceous earth; Tripoli; Volcanic ash; Millstones; Novaculite.

Asbestos; Feldspar; Mica; Quartz; Gypsum; Graphite; Fuller's earth; Infusorial earth; Magnesite; Mineral paint; Chromium; Chromite; Chromic iron ore; Fluorspar; Barite; Barytes; Strontium; Arsenic; Pyrite; Sulphur; Sulphate of soda; Cryolite; Phosphorus; Phosphate; Apatite; Glauconite; Borax; Bromine; Salt; Natron deposits.

4. DYNAMIC AND STRUCTURAL.

Earth, genesis of; Earth, age of; Earth, interior of; Earth, temperature of.

Volcanoes; Earthquakes; Seismographs.

Isostasy; Orogeny; Changes of level.

Magmas; Intrusions; Dikes; Laccoliths; Metamorphism; Contact phenomena.

Deformation; Folding; Faulting; Unconformities.

Conglomerates; Concretions; Stalactites; Jointing; Cleavage.

Sedimentation; Denudation; Erosion; Caves; Sink holes; Erratic boulders; Weathering; Wind work; Dunes; Loess; Landslides.

Glaciers; Glacial erosion; Eskers; Kames; Moraines; Kettle holes.

Drainage changes.

5. PHYSIOGRAPHIC.

Geomorphy; Relief maps.

Valleys; Cirques; Deserts; Dunes; Deltas; Alluvial fans; Eskers; Kames; Mounds, natural; Natural bridges; Sink holes; Karsts.

Lakes; Swamps; Marshes; Everglades; Terraces; Shore lines; Rivers; Meanders; Falls; Springs.

6. HISTORICAL OR STRATIGRAPHIC.

Geologic history; Geologic time; Paleogeography; Paleogeographic maps; Paleoclimatology.

Geologic maps; Geologic formations described (list).

Pre-Cambrian, Cambrian; Ordovician; Silurian; Devonian; Carboniferous; Triassic; Jurassic; Cretaceous; Tertiary; Quaternary; Recent; Glacial geology; Glaciation; Glacial lakes; Ice ages.

7. PALEONTOLOGY.

Geographic distribution.

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Mollusca; Cephalopoda; Gastropoda; Pelecypoda.

Molluscoidea; Brachiopoda; Bryozoa; Vermes.

Echinodermata; Echinoidea; Asteroidea; Crinoidea; Crystoidea.

Coelenterata; Anthozoa; Hydrozoa; Graptolites.

Protozoa; Spongida; Foraminifera.

Paleobotany; Diatoms.

Problematica.

8. PETROLOGY.

Rocks, origin; Rocks described (list); Igneous and volcanic rocks; Rock-forming minerals.

9. MINERALOGY.

Minerals described (list); Crystallography; Pseudomorphism; Paragenesis of minerals; Rock-forming minerals; Meteorites.

10. UNDERGROUND WATER.

Mine waters; Thermal waters; Geysers; Springs; Mineral waters.

11. SOILS.

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- Chickamauga limestone, Ordovician, Virginia: Bassler, 78.
- Chickies quartzite, Cambrian, Pennsylvania: Bascom *et al.*, 74, 75.
- Chico formation, Cretaceous, California: Arnold, 31; Branner, *et al.*, 138.
- Chipola marl member, Oligocene, Florida: Matson and Clapp, 829.
- Chispa andesite, Tertiary, Nevada: Ransome, 976.
- Chitstone limestone, Triassic, Alaska: Moffit and Maddren, 875.
- Choctawhatchee marl, Pliocene, Florida: Matson and Clapp, 829.
- Chouteau formation, Mississippian, Missouri: Buckley, 158.
- Chouteau limestone, Mississippian, Missouri and Illinois: Weller, 1218.
- Chugwater formation, Triassic?, Wyoming: Darton and Siebenthal, 313.
- Cimarron series, Carboniferous, Kansas: Haworth and Bennett, 518.
- Claggett, Cretaceous, Canada: Dowling, 350.
- Claggett beds, Cretaceous, Montana: Douglass, 348.
- Claggett formation, Cretaceous, Montana: Fisher, 397; Pepperberg, 949; Stone, 1114.
- Claggett formation, Cretaceous, Wyoming: Washburne, 1204.
- Claiborne group, Tertiary, Georgia: Veatch, 1184.
- Claiborne stage, Eocene, Louisiana and Texas: Harris, 512.
- Clallam formation, Oligocene-Miocene, Washington: Reagan, 989.
- Clarke interglacial, Pleistocene, Ontario: Coleman, 269.
- Clarksville division, Ohio: Foerste, 413.
- Clear Creek (Oriskany), Devonian, Missouri: Buckley, 158.
- Clinch sandstone, Ordovician, Virginia: Bassler, 78.
- Clinton limestone, Silurian, Indiana: Kindle and Barnett, 670.
- Clinton shale, Silurian, Pennsylvania: Stose, 1119.
- Cloverly formation, Cretaceous, Wyoming: Darton and Siebenthal, 313; Washburne, 1204.
- Coaledo formation, Tertiary, Oregon: Dall, 300.
- Cobleskill waterlime, Silurian, New York: Luther, 786.
- Coeymans limestone, Devonian, New Jersey: Kummel, 682.
- Coffeyville limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Cohansey sand, Miocene, New Jersey: Kummel, 682.
- Cohansey sand, Tertiary, New Jersey: Bascom *et al.*, 74, 75.
- Collier shale, Arkansas: Purdue, 972, 973.
- Colorado formation, Cretaceous, Montana: Fisher, 397.
- Colorado formation, Cretaceous, North Dakota: Barry and Melsted, 70.
- Colorado formation, Cretaceous, Texas: Richardson, 998.
- Colorado group, Cretaceous, Colorado: Henderson, 536.
- Colorado group, Cretaceous, South Dakota: Todd, 1146.
- Colorado group, Cretaceous, Wyoming: Smith, 1077.
- Colorado shale, Cretaceous, Montana: Calvert, 185; Fisher, 396; Stone, 1114.
- Colorado shale, Cretaceous, Wyoming: Washburne, 1204; Woodruff, 1284.
- Columbia formation, Pleistocene, Georgia: Veatch, 1184.
- Columbus limestone, Devonian, Ohio: Stauffer, 1096.
- Comanche formation, Cretaceous, Colorado: Henderson, 536.
- Comanche series, Cretaceous, Texas: Richardson, 998.
- Conasauga shale, Cambrian, Georgia: Veatch, 1184.
- Conchos gravels, Mexico: Burrows, 171.
- Conemaugh formation, Carboniferous, Ohio: Condit, 280.
- Conemaugh series, Carboniferous, West Virginia: Hennen, 537.
- Conococheague limestone, Cambrian, Pennsylvania: Stose, 1119.
- Conococheague limestone, Cambro-Ordovician, Virginia: Bassler, 78.
- Coos conglomerate, Tertiary: Dall, 300.
- Coplay limestone, Ordovician, Pennsylvania: Wherry, 1229.
- Cottonwood limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Cottonwood white layer, Eocene, Wyoming: Matthew, 834.
- Council Grove stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Crab Orchard formation, Silurian, Kentucky: Foerste, 409.
- Craghead Creek shale, Devonian, Missouri: Greger, 491.
- Crescent formation, Eocene, Washington: Reagan, 989.
- Crystal Mountain sandstone, Ordovician, Arkansas: Purdue, 972, 973.
- Cuchillo formation, Mexico: Burrows, 171.
- Cusseta sand, Cretaceous, Georgia: Veatch, 1184.
- Cuyahoga formation, Carboniferous, Ohio: Carney, 200.

- Cuyahoga formation, Mississippian, Ohio and Kentucky: Morse and Foerste, 887.
- Cynthiana formation, Ordovician, Kentucky: Foerste, 413.
- Cynthiana formation, Ordovician, Ohio and Kentucky: Foerste, 412.
- Cypress formation, Mississippian, Missouri: Buckley, 158.
- Dakota, Cretaceous, Canada: Dowling, 350.
- Dakota formation, Cretaceous, Colorado: George and Crawford, 446; Henderson, 536.
- Dakota sandstone, Cretaceous, Colorado: Gale, 433; Martin, 819.
- Dakota sandstone, Cretaceous, Colorado and Utah: Richardson, 1000.
- Dakota sandstone, Cretaceous, New Mexico: Gardner, 436.
- Dakota sandstone, Cretaceous, North Dakota: Barry and Melsted, 70; Willard, 1253.
- Dakota sandstone, Cretaceous, South Dakota: Darton, 307; Darton and O'Harra, 312; Todd, 1146.
- Dakota sandstone, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Davis formation, Cambrian, Missouri: Buckley, 158.
- Deadwood sandstone, Cambrian, South Dakota: Darton, 307.
- Deadwood formation, Cambrian, Wyoming and South Dakota: Darton, 306.
- Decker Ferry formation, Silurian, New Jersey: Kümmel, 682.
- Deer Creek limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Delaware limestone, Devonian, Ohio: Stauffer, 1096.
- Dennis limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Derby formation, Cambrian, Missouri: Buckley, 158.
- Des Moines stage, Carboniferous, Iowa: Lees, 751.
- De Soto beds, Pliocene, Florida: Matson and Clapp, 829.
- Detroit River series (upper Monroe), Silurian: Lane *et al.*, 733.
- Doerun formation, Cambrian, Missouri: Buckley, 158.
- Dolgeville shales, Ordovician, New York: Miller, 867.
- Don beds, Pleistocene, Ontario: Coleman, 269.
- Douglas stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Doyle shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Dripping Spring quartzite, Cambrian, Arizona: Truesdell, 1155.
- Drum limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Dundee limestone, Devonian, Michigan and adjacent; Sherzer and Grabau, 1058.
- Dunkard series, Carboniferous, West Virginia: Hennen, 537.
- Eagle, Cretaceous, Canada: Dowling, 350.
- Eagle beds, Cretaceous, Montana: Douglass, 348.
- Eagle sandstone, Cretaceous, Montana: Calvert, 185; Fisher, 397; Pepperberg, 949; Stone, 1114.
- Eagle sandstone, Cretaceous, Wyoming: Washburne, 1204; Woodruff, 1284.
- Eagle Ford formation, Cretaceous, Texas: Gordon, 465.
- Eden formation, Ordovician, Cincinnati region: Grabau, 472.
- Eden shale, Ordovician, Kentucky: Matson, 827.
- Edgewood limestone, Silurian, Illinois and Missouri: Savage, 1027.
- Edmonton, Cretaceous, Alberta: Dowling, 350.
- Edmonton formation, Cretaceous, Alberta: Dowling, 352.
- Elbert formation, Devonian, Colorado: Kindle, 666.
- Elbrook formation, Cambrian, Pennsylvania: Stose, 1119.
- Elbrook limestone, Cambro-Ordovician, Virginia: Bassler, 78.
- Ellis formation, Jurassic, Montana: Calvert, 185; Fisher, 396, 397.
- Elmdale formation, Carboniferous, Kansas: Haworth and Bennett, 518.
- Elm Grove limestone, Carboniferous, West Virginia: Hennen, 537.
- El Paso limestone, Ordovician, Texas: Richardson, 998.
- Eminence formation, Cambrian, Missouri: Buckley, 158.
- Empire formation, Tertiary, Oregon: Dall, 300.
- Emporia limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Enfield shale member, Devonian, New York: Williams, 1254.
- Englewood limestone, Carboniferous, South Dakota: Darton, 307.
- Englewood limestone, Carboniferous, Wyoming and South Dakota: Darton, 306.
- Englishtown sand, Cretaceous, New Jersey: Bascom *et al.*, 74, 75; Kümmel, 682.
- Enterprise shales, Carboniferous, Kansas: Beede, 90.
- Erian, Devonian, New York: Luther, 786.
- Esbridge shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Emerald formation, Tertiary, Nevada: Turner, 1156.
- Esopus grit, Devonian, New Jersey: Kümmel, 682.
- Espina breccia, Tertiary, Nevada: Ransome, 976.
- Estill clay, Silurian, Kentucky: Foerste, 409.
- Etchegoin formation, Miocene, California: Arnold, 30.
- Etchegoin-Jacalitos formation, California: Johnson, 631.
- Etcheminian, Cambrian, North America: Grabau, 472.
- Eutaw formation, Cretaceous, Georgia: Veatch, 1184.
- Everglades limestone, Pleistocene, Florida: Matson and Clapp, 829.
- Fern Glen formation, Devonian, Missouri: Buckley, 158.
- Fern Glen formation, Mississippian, Missouri and Illinois: Weller, 1218, 1221.
- Fern Glen shale, Mississippian, Illinois and Missouri: Fenneman, 392.
- Fernie shale, Jurassic, British Columbia: Dowling, 350.
- Fernvale limestone, Ordovician, Illinois: Savage, 1027.

- Fish Creek beds, Cretaceous, Montana: Douglass, 348.
- Fish Creek sandstone, Carboniferous, West Virginia: Hennen, 537.
- Fishkill limestone, Cambro-Ordovician, New York: Clarke, 240.
- Flat Rock dolomite, Silurian, Michigan and adjacent: Sherzer and Grabau, 1058.
- Flat Rock dolomites, Silurian, Michigan: Lane *et al.*, 733.
- Fleming Inlet series, Triassic, Greenland: Norden-skjöld, 900.
- Florena shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Florence flint, Carboniferous, Kansas: Haworth and Bennett, 518.
- Floridian group, Pliocene, Florida: Matson and Clapp, 829.
- Floyd shales, Carboniferous, Georgia: Veatch, 1184.
- Fordham gneiss, New York: Berkey, 101, 103; Koebelin, 679.
- Forelle limestone, Carboniferous, Wyoming: Darton and Siebenthal, 313.
- Fork Mountain slate, Arkansas: Purdue, 972.
- Fort Ancient division, Ordovician, Ohio: Foerste, 413.
- Fort Benton formation, Cretaceous, Montana: Douglass, 348.
- Fort Payne chert, Carboniferous, Georgia: Veatch, 1184.
- Fort Riley limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Fort Scott limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Fort Union beds, Cretaceous, Montana: Douglass, 348.
- Fort Union formation, Eocene, Montana: Stanton, 1094.
- Fort Union formation, Eocene, North Dakota: Leonard, 758.
- Fort Union formation, Eocene, North Dakota and Montana: Leonard and Smith, 761.
- Fort Union formation, Eocene, Wyoming, North and South Dakota, and Montana: Knowlton, 678.
- Fort Union formation, Tertiary, Wyoming: Shaw, 1054; Washburne, 1204; Woodruff, 1283, 1284.
- Fort Union formation, Tertiary, Montana: Peppenberg, 949; Smith, 1076; Stone, 1164.
- Fountain formation, Pennsylvanian, Colorado: Henderson, 536.
- Fountain formation, Triassic?, Colorado: Martin, 819.
- Fox Hills formation, Cretaceous, Colorado: Henderson, 536; Martin, 819.
- Fox Hills formation, Cretaceous, Montana: Douglass, 348.
- Fox Hills formation, Cretaceous, North Dakota: Leonard, 758.
- Fox Hills sandstone, Cretaceous, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Fox Hills (?) sandstone, Cretaceous?, Montana: Smith, 1076.
- Fox Hills sandstone, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Fox Hills substage, Cretaceous, Mexico: Aguilera, 10.
- Franciscan formation, Jurassic?, California: Arnold, 30, 31; Branner *et al.*, 138.
- Franklin limestone, pre-Cambrian, New Jersey: Kimmel, 682.
- Franklin limestone formation, pre-Cambrian, New Jersey: Bayley, 86.
- Franklin limestone, pre-Cambrian, Pennsylvania: Bascom *et al.*, 75.
- Fulton green shale, Carboniferous, West Virginia: Hennen, 537.
- Fuson formation, Cretaceous, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Fuson formation, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Fusselman limestone, Silurian, Texas: Richardson, 998.
- Galesburg shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Garrard sandstone, Ordovician, Kentucky: Foerste, 413.
- Garrison formation, Carboniferous, Kansas: Haworth and Bennett, 518.
- Gasconade formation, Cambrian, Missouri: Buckley, 158.
- Gaspé sandstone, Devonian, Canada: Williams, 1254.
- Genesee shale, Devonian, New York: Luther, 786; Williams, 1254.
- Geneva limestone, Devonian, Indiana: Kindle and Barnett, 670.
- Genundewa limestone, Devonian, New York: Luther, 786.
- Gila conglomerate, Quaternary, Arizona: Truesdell, 1155.
- Gilboy sandstone, Carboniferous, West Virginia: Hennen, 537.
- Gilmore sandstone, Carboniferous, West Virginia: Hennen, 537.
- Girardeau limestone, Silurian, Illinois and Missouri: Savage, 1027.
- Glendale granite, Tertiary, Colorado: Crawford, 290.
- Glen Park formation, Devonian, Missouri: Buckley, 158.
- Glen Rose formation, Cretaceous, Texas: Hess, 551.
- Globe limestone, Devonian-Carboniferous, Arizona: Truesdell, 1155.
- Goodland limestone, Cretaceous, Oklahoma: Taff and Reed, 1132.
- Gower limestone, Silurian, Illinois and Iowa: Carman, 198.
- Grand Rapids group, Carboniferous, Michigan: Cooper, 285.
- Grand Tower, Devonian, Missouri: Buckley, 158.
- Grainger formation, Devonian, Virginia: Bassler, 78.
- Graneros shale, Cretaceous, South Dakota: Darton, 307.
- Graneros shale, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Greenbrier limestone, Mississippian, Virginia: Bassler, 78.
- Greendale bed, Ordovician, Kentucky: Foerste, 413.
- Greenfield dolomite, Silurian, Ohio: Lane *et al.*, 733; Sherzer and Grabau, 1058.
- Greenhorn limestone, Cretaceous, South Dakota: Darton, 307; Darton and O'Harra, 312.

- Greenhorn limestone, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Green Pond conglomerate, Silurian, New Jersey: Kummel, 682.
- Green River formation, Tertiary, Colorado: Gale, 433; Lee, 743.
- Green River formation, Tertiary, Wyoming: Schultz, 1039.
- Grenville gneiss, pre-Cambrian, New York: Miller, 867.
- Grimes sandstone, Devonian, New York: Luther, 786.
- Guanajuato conglomerate, Mexico: Botsford, 129.
- Gunnison formation, Jurassic?, Colorado: Lee, 743.
- Gunnison formation, Juratrias, Colorado: Spurr, 1091.
- Hampton shale, Cambrian, Virginia: Bassler, 78.
- Hancock limestone, Devonian, Virginia: Bassler, 78.
- Hannibal formation, Mississippian, Missouri: Buckley, 158.
- Harpers schist, Cambrian, Pennsylvania: Stose, 1119.
- Harpers shale, Cambrian, Virginia: Bassler, 78.
- Hardyston quartzite, Cambrian, New Jersey: Kummel, 682.
- Hatch shale and flags, Devonian, New York: Luther, 786.
- Hawthorne formation, Oligocene, Florida: Matson and Clapp, 829.
- Helderberg limestone, Silurian, Pennsylvania: Stose, 1119.
- Hell Creek beds, Cretaceous, Montana: Stanton, 1094.
- Hell Creek beds, Eocene, Montana: Knowlton, 678.
- Herculean shale member, Tertiary, California: Weaver, 1212.
- Herington limestone, Carboniferous, Kansas: Beede, 90.
- Highbridge limestone, Ordovician, Kentucky: Matson, 827.
- High Falls formation, Silurian, New Jersey: Kummel, 682.
- High Point sandstone, Devonian, New York: Luther, 786.
- Hoko formation, Pliocene, Washington: Reagan, 989.
- Holston marble, Ordovician, Virginia: Bassler, 78.
- Honaker limestone, Cambrian, Virginia: Bassler, 78.
- Hopkinton limestone, Silurian, Illinois and Iowa: Carman, 198.
- Hornerstown marl, Cretaceous, New Jersey: Bascom *et al.*, 74, 75; Kummel, 682.
- Howard limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Hudson River (Thebes), Ordovician, Missouri: Buckley, 158.
- Hueco limestone, Pennsylvanian, Texas: Richardson, 998.
- Hundred sandstone, Carboniferous, West Virginia: Hennen, 537.
- Huronian, pre-Cambrian, Ontario: Collins, 276.
- Hurry Inlet series, Triassic, Greenland: Nordenskjöld, 900.
- Hygiene sandstone, Cretaceous, Colorado: Henderson, 536.
- Hygiene sandstone member, Cretaceous, Colorado: Martin, 819.
- Idaho Springs formation, Colorado: Patton, 943.
- Illinoian drift, Pleistocene, Iowa: Calvin, 187.
- Illinoian epoch, Quaternary, Illinois and Missouri: Fenneman, 392.
- Illinoian glacial epoch, Quaternary, Illinois and Iowa: Carman, 198.
- Illinoian till, Pleistocene, Ontario: Coleman, 269.
- Indian Fields member, Silurian, Kentucky: Foerste, 409.
- Inwood limestone, New York: Berkey, 101, 103; Koeberlin, 679.
- Iola limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Iowan drift, Pleistocene, Iowa: Calvin, 187.
- Iowan glacial epoch, Quaternary, Illinois and Iowa: Carman, 198.
- Iowan till, Pleistocene, Ontario: Coleman, 269.
- Iroquois clay, Pleistocene, Ontario: Coleman, 269.
- Irvine formation, Tertiary, Kentucky: Matson, 827.
- Ithaca shale member, Devonian, New York: Williams, 1254.
- Jacalitos formation, Miocene, California: Arnold, 30.
- Jackfork sandstone, Carboniferous, Oklahoma: Taff, 1130.
- Jackson stage, Eocene, Louisiana and Texas: Harris, 512.
- Jacksonburg limestone, Ordovician, New Jersey: Kummel, 682.
- Jacksonville formation, Miocene, Florida: Matson and Clapp, 829.
- Jefferson City formation, Cambrian, Missouri: Buckley, 158.
- Jeffersonville limestone, Devonian, Kentucky: Bassler, 80.
- Joachim formation, Ordovician, Missouri: Buckley, 158.
- Joliet conglomerate, Pleistocene, Illinois: Goldthwait, 461.
- Jollytown sandstone, Carboniferous, West Virginia: Hennen, 537.
- Judith River beds, Cretaceous, Montana: Douglass, 348.
- Judith River formation, Cretaceous, Montana: Pepperberg, 948, 949; Stone, 1114.
- Judith River formation, Cretaceous, Wyoming: Washburne, 1204.
- Juniata formation, Ordovician, Pennsylvania: Stose, 1119.
- Juniata red beds, Ordovician, Pennsylvania: Grabau, 476.
- Kanouse sandstone, Devonian, New Jersey: Kummel, 682.
- Kansan drift, Pleistocene, Iowa: Calvin, 187.
- Kansan epoch, Quaternary, Illinois and Missouri: Fenneman, 392.
- Kansan glacial epoch, Quaternary, Illinois and Iowa: Carman, 198.
- Kansan or pre-Kansan drift, Pleistocene, New Jersey: Kummel, 682.
- Kanwaka shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Keewatin, pre-Cambrian, Ontario: Collins, 276.
- Kendall tuff, Tertiary, Nevada: Ransome, 976.

- Kennicott formation, Jurassic or Cretaceous, Alaska: Moffit and Maddren, 875.
- Keokuk formation, Mississippian, Missouri: Buckley, 158.
- Key Largo limestone, Pleistocene, Florida: Sanford, 1025.
- Key West oolite, Pleistocene, Florida: Sanford, 1025.
- Kibbey sandstone, Carboniferous, Montana: Fisher, 396.
- Kickapoo limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Kiger stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Kimmswick formation, Ordovician, Missouri: Buckley, 158.
- Kimmswick limestone, Ordovician, Illinois: Savage, 1027.
- Kimmswick limestone, Ordovician, Missouri: Weller, 1218.
- Kinderhook formation, Mississippian, Illinois and Missouri: Fenneman, 392.
- Kingsbury conglomerate, Eocene, Wyoming: Knowlton, 678.
- Kingsbury conglomerate, Tertiary, Wyoming: Stanton, 1094.
- Kingston or Port Ewen beds, Devonian, New Jersey: Kümmel, 682.
- Kirkwood formation, Tertiary, New Jersey: Bascom *et al.*, 74, 75; Kümmel, 682.
- Kittatinny limestone, Cambrian, New Jersey: Kümmel, 682.
- Knob (Riverside) sandstone, Mississippian, Kentucky: Bassler, 80.
- Knobstone group, Mississippian, Kentucky: Bassler, 80.
- Knox dolomite, Cambro-Ordovician, Virginia: Bassler, 78.
- Knox dolomite, Ordovician, Georgia: Veatch, 1184.
- Knoxville formation, Cretaceous, California: Arnold, 31; Branner *et al.*, 138.
- Knoxville-Chico rocks, Cretaceous, California: Arnold, 30; Johnson, 631.
- Kootanie, Cretaceous, Canada: Dowling, 350.
- Kootanie formation, Cretaceous, Alberta: Dowling, 352.
- Kootenai formation, Cretaceous, Montana: Calvert, 185; Fisher, 396, 397; Stone, 1114.
- Labette shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Ladore shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Lafayette formation, Illinois and Missouri: Fenneman, 392.
- Lafayette formation, Pliocene, Florida: Matson and Clapp, 829.
- Lafayette formation, Tertiary, Georgia: Veatch, 1184.
- Lafayette formation, Tertiary, New Jersey: Bascom *et al.*, 74.
- Lafayette gravels, Tertiary, Missouri: Buckley, 158.
- Lake Valley beds, Mississippian: Weller, 1218.
- Lakota sandstone, Cretaceous, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Lakota sandstone, Cretaceous, Wyoming and South Dakota: Darton, 306.
- La Luz schists, Mexico: Botsford, 129.
- Lamotte formation, Cambrian, Missouri: Buckley, 158.
- Lance Creek beds, Cretaceous, Wyoming: Stanton, 1094.
- Lance Creek beds, Eocene, Wyoming: Knowlton, 678.
- Lane shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Lanoria quartzite, pre-Cambrian, Texas: Richardson, 998.
- Laramie formation, Colorado: George and Crawford, 446.
- Laramie formation, Cretaceous, Colorado: Gale, 433; Henderson, 536; Martin, 819.
- Laramie formation, Cretaceous, Great Plains and Rocky Mountain region: Cross, 294.
- Laramie, Cretaceous, Montana: Douglass, 348; Stone, 1114.
- Laramie, Cretaceous, Mexico: Aguilera, 10.
- Laramie formation, Cretaceous, New Mexico: Gardner, 436.
- Laramie formation, Cretaceous, Wyoming: Ball, 57; Schultz, 1039; Smith, 1077; Washburne, 1204; Woodruff, 1284.
- Laramie, Colorado, Wyoming, and Montana: Peale, 944.
- Laramie? formation, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Las Vegas formation, Mexico: Burrows, 171.
- Laurentian, pre-Cambrian, Ontario: Collins, 276.
- Lawrence shales, Carboniferous, Kansas: Haworth and Bennett, 518; Yates, 1295.
- Leclaire limestone, Silurian, Illinois and Iowa: Carman, 198.
- Lecompton shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Leda clay, Pleistocene, Ontario: Coleman, 269.
- Leithsville formation, Cambrian, Pennsylvania: Wherry, 1229.
- Le Roy shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Levyville formation, Oligocene, Florida: Matson and Clapp, 829.
- Lewis shale, Cretaceous, Colorado: Gale, 433.
- Lewis shale, Cretaceous, New Mexico: Gardner, 436.
- Lewis shale, Cretaceous, Wyoming: Ball, 57; Schultz, 1039; Stanton, 1094.
- Lewistown limestone, Silurian-Devonian, Virginia: Bassler, 78.
- Lexington limestone, Ordovician, Kentucky: Matson, 827.
- Liberty Hall formation, Ordovician, Virginia: Bassler, 78.
- Light-house granite, Connecticut: Ward, 1201.
- Linietta clays, Mississippian, Kentucky: Morse and Foerste, 887.
- Livingston formation, Tertiary, Montana: Stone, 1114.
- Lockatong beds, Triassic, New Jersey: Kümmel, 682.
- Lockatong formation, Triassic, Pennsylvania: Bascom *et al.*, 74, 75.
- Logan formation, Carboniferous, Ohio: Carney, 200.
- Logan formation, Mississippian, Ohio and Kentucky: Morse and Foerste, 887.
- Lone Tree white layer, Eocene, Wyoming: Mathew, 834.

- Longwood shale, Silurian, New Jersey: Kümmel, 682.
- Lookout sandstone, Carboniferous, Georgia: Veatch, 1184.
- Lorraine beds, Ordovician, New York: Miller, 867.
- Losee gneiss, New Jersey: Bayley, 86.
- Losee gneiss, pre-Cambrian, New Jersey: Kümmel, 682.
- Lostmans River limestone, Pleistocene, Florida: Matson and Clapp, 829; Sanford, 1025.
- Loudon formation, Cambrian, Virginia: Bassler, 78.
- Louisiana formation, Mississippian, Missouri: Buckley, 158.
- Louisville formation, Silurian, Kentucky: Bassler, 80.
- Louisville limestone, Silurian, Indiana: Kindle and Barnett, 670.
- Lowville, Ordovician, New York: Grabau, 472.
- Lowville limestone, Ordovician, New York: Miller, 867.
- Lucas dolomite, Silurian, Michigan and Ohio: Sherzer and Grabau, 1058.
- Lucas dolomite, Silurian, Ohio: Lane *et al.*, 733.
- Ludlowville shale, Devonian, New York: Luther, 786.
- Luta limestone, Carboniferous, Kansas: Beede, 90.
- Lykins formation, Permo-Triassic?, Colorado: Henderson, 536.
- Lykins formation, Triassic, Colorado: Martin, 819.
- Lyons formation, Pennsylvanian, Colorado: Henderson, 536.
- Lyons sandstone, Triassic, Colorado: Martin, 819.
- McAdam formation, Silurian, Nova Scotia: Twenhofel, 1158.
- Madera limestone, Pennsylvanian, New Mexico: Lee, 745.
- Madison limestone, Carboniferous, Montana: Fisher, 396, 397.
- Madison limestone, Mississippian, Montana: Calvert, 185.
- Magdalenagroup, Pennsylvanian, New Mexico: Lee, 745.
- Magothy formation, Cretaceous, Atlantic coastal plain: Bibbins, 113.
- Magothy formation, Cretaceous, New Jersey: Bascom *et al.*, 74, 75; Kümmel, 682.
- Mahoning sandstone, Carboniferous, Pennsylvania: Raymond, 983.
- Malpais basalt, Tertiary, Nevada: Ransome, 976.
- Manasquan formation, Cretaceous, New Jersey: Bascom *et al.*, 75.
- Manasquan marl, Cretaceous, New Jersey: Kümmel, 682.
- Manatee River marl, Oligocene, Florida: Matson and Clapp, 829.
- Mancos shale, Cretaceous, Colorado: Gale, 433; George and Crawford, 446; Lee, 743.
- Mancos shale, Cretaceous, Colorado and Utah: Richardson, 1000.
- Mancos shale, Cretaceous, New Mexico: Gardner, 436.
- Manhattan schist, New York: Berkey, 101, 103; Koerberlin, 679.
- Manitoban series, Devonian, Manitoba: Dowling, 350.
- Manlius limestone, Silurian, New Jersey: Kümmel, 682.
- Manlius limestone, Silurian, New York: Luther, 786.
- Mannington sandstone, Carboniferous, West Virginia: Hennen, 537.
- Manzano group, Pennsylvanian, New Mexico: Lee, 745.
- Maquoketa shale, Ordovician, Illinois and Iowa: Carman, 198.
- Marcellus shale, Devonian, New Jersey: Kümmel, 682.
- Marcellus shale, Devonian, New York: Luther, 786.
- Marietta sandstones, Carboniferous, West Virginia: Hennen, 537.
- Marianna limestone, Oligocene, Florida: Matson and Clapp, 829.
- Marion limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Marion stage, Carboniferous, Kansas: Beede, 90.
- Maroon formation, upper Carboniferous, Colorado: Spurr, 1091.
- Marmaton stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Marshall sandstone, Carboniferous, Michigan: Cooper, 285.
- Marshalltown clay-marl, Cretaceous, New Jersey: Kümmel, 682.
- Marshalltown formation, Cretaceous, New Jersey: Bascom *et al.*, 74, 75.
- Martinsburg shale, Ordovician, New Jersey: Kümmel, 682.
- Martinsburg shale, Ordovician, Pennsylvania: Stose, 1119.
- Martinsburg shale, Ordovician, Virginia: Bassler, 78.
- Maryville limestone, Cambrian, Virginia: Bassler, 78.
- Massanutten sandstone, Ordovician, Virginia: Bassler, 78.
- Matawan group, Cretaceous, New Jersey: Bascom *et al.*, 74, 75.
- Matfield shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Maysville formation, Ordovician, Kentucky: Matson, 827.
- Meda rhyolite, Tertiary, Nevada: Ransome, 976.
- Medora group of lignite beds, Eocene, North Dakota: Leonard and Smith, 761.
- Merced formation, Pliocene, California: Branner *et al.*, 138.
- Merchantville clay, Cretaceous, New Jersey: Bascom *et al.*, 74, 75; Kümmel, 682.
- Mesaverde formation, Cretaceous, Colorado: Gale, 433; Lee, 743.
- Mesaverde formation, Cretaceous, Colorado and Utah: Richardson, 1000.
- Mesaverde formation, Cretaceous, New Mexico: Gardner, 436.
- Mesaverde formation, Cretaceous, Wyoming: Ball, 57; Schultz, 1039; Smith, 1077; Stanton, 1094.
- Miami oolite, Pleistocene, Florida: Matson and Clapp, 829; Sanford, 1025.
- Michigan series, Carboniferous, Michigan: Cooper, 285.
- Midway formation, Eocene, Louisiana: Harris, 512.
- Midway formation, Tertiary, Georgia: Veatch, 1184.
- Million bed, Ordovician, Kentucky: Foerste, 413.
- Milltown andesite, Tertiary, Nevada: Ransome, 976.

- Minnekahta limestone, Carboniferous, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Minnekahta limestone, Carboniferous, Wyoming and South Dakota: Darton, 306.
- Minnelusa sandstone, Carboniferous, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Minnelusa sandstone, Carboniferous, Wyoming and South Dakota: Darton, 306.
- Minnewaste limestone, Cretaceous, South Dakota: Darton, 307.
- Mira basalt, Tertiary, Nevada: Ransome, 976.
- Missouri Mountain formation, Ordovician, Arkansas: Purdue, 973.
- Missouri Mountain slate, Arkansas: Purdue, 972.
- Moccasin limestone, Ordovician, Virginia: Bassler, 78.
- Monmouth group, Cretaceous, New Jersey: Bascom *et al.*, 74, 75.
- Monongahela series, Carboniferous, West Virginia: Hennen, 537.
- Monroan, Silurian, Michigan, Ohio, and Canada: Grabau, 472.
- Monroe formation, Silurian, Michigan and adjacent: Sherzer and Grabau, 1058.
- Monroe formation, Silurian, Michigan, Ohio, and New York: Lane *et al.*, 733.
- Montalto quartzite member, Cambrian, Pennsylvania: Stose, 1119.
- Montana formation, Cretaceous, Wyoming: Shaw, 1054.
- Montana group, Cretaceous, Colorado: Henderson, 536.
- Montana group, Cretaceous, Montana: Calvert, 185; Fisher, 397; Pepperberg, 949; Stone, 1114.
- Montana group, Cretaceous, South Dakota: Todd, 1146.
- Montana group, Cretaceous, Wyoming: Darton and Siebenthal, 313; Woodruff, 1284.
- Montana stage, Cretaceous, Mexico: Aguilera, 10.
- Monterey shale, Miocene, California: Branner *et al.*, 138.
- Monterey shales, Miocene, California: Johnson, 631.
- Montezuma granite, Colorado: Patton, 943.
- Montoya limestone, Ordovician, Texas: Richardson, 998.
- Mora sandstones, New Mexico: Keyes, 654.
- Morena rhyolite, Tertiary, Nevada: Ransome, 976.
- Morrison formation, Cretaceous, Colorado: Hennen, 538.
- Morrison formation, Cretaceous, Wyoming: Darton and Siebenthal, 313.
- Morrison formation, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Morrison formation, Jurassic, Colorado: Henderson, 536.
- Morrison formation, Jurassic, Montana: Calvert, 185; Fisher, 397.
- Morrison formation, Jurassic or Cretaceous, Colorado: Martin, 819.
- Morrison shale, Cretaceous, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Morrison shale, Jurassic?, Montana: Fisher, 396.
- Moscow shale, Devonian, New York: Luther, 786.
- Mound Valley limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Mount Laurel sand, Cretaceous, New Jersey: Bascom *et al.*, 74, 75; Kummel, 682.
- Mount Morris limestone, Carboniferous, West Virginia: Hennen, 537.
- Mount Sicker series, Mesozoic, British Columbia: Clapp, 228.
- Mowry member, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Moydart formation, Silurian, Nova Scotia: Twenhofel, 1158.
- Murat limestone, Ordovician, Virginia: Bassler, 78.
- Nashua marl, Pliocene, Florida: Matson and Clapp, 829.
- Nastapoka group, Canada: Young, 1297.
- Nation River formation, Carboniferous, Alaska: Prindle, 969.
- Natural Bridge limestone, Cambro-Ordovician, Virginia: Bassler, 78.
- Navarro formation, Cretaceous, Texas: Gordon, 465.
- Navesink marl, Cretaceous, New Jersey: Bascom *et al.*, 74, 75; Kummel, 682.
- Nazareth cement rock, Ordovician, Pennsylvania: Wherry, 1229.
- Nebraskan drift sheet, Pleistocene, Iowa: Shimek, 1060.
- Neosho member, Carboniferous, Kansas: Haworth and Bennett, 518.
- Neva limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- New Albany shale, Devonian, Kentucky: Bassler, 80.
- Newark group, Triassic, Pennsylvania: Bascom *et al.*, 74, 75.
- Newland formation, Algonkian, Idaho and Montana: Calkins, 181.
- Newman limestone, Mississippian, Virginia: Bassler, 78.
- New Providence shale, Mississippian, Indiana and Kentucky: Weller, 1218.
- New Providence shale, Mississippian, Kentucky: Bassler, 80.
- New Scotland beds, Devonian, New Jersey: Kummel, 682.
- Niagara limestone, Silurian, Illinois and Iowa: Carman, 198.
- Niagara (Bainbridge), Silurian, Missouri: Buckley, 158.
- Niagaran, Silurian: Grabau, 472.
- Niagaran limestone, Silurian, Kentucky: Bassler, 80.
- Nicholas bed, Ordovician, Kentucky: Foerste, 413.
- Nicholas beds, Ordovician, Kentucky and Ohio: Foerste, 412.
- Nikolai greenstone, Alaska: Moffit and Maddren, 875.
- Nineveh sandstone, Carboniferous, West Virginia: Hennen, 537.
- Niobrara, Cretaceous, Canada: Dowling, 350.
- Niobrara, Cretaceous, North Dakota: Barry and Melsted, 70.
- Niobrara formation, Cretaceous, Colorado: Henderson, 536.
- Niobrara limestone, Cretaceous, Colorado: Martin, 819.
- Niobrara formation, Cretaceous, South Dakota: Darton, 307; Darton and O'Harra, 312; Todd, 1146.
- Niobrara formation, Cretaceous, Wyoming: Darton and Siebenthal, 313.

- Niobrara formation, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Nipissing clay, Pleistocene, Ontario: Coleman, 269.
- Nisky formation, Ordovician, Pennsylvania: Wherry, 1229.
- Nolichucky shale, Cambrian, Virginia: Bassler, 78.
- Oak Grove sand member, Oligocene, Florida: Matson and Clapp, 829.
- Ocala limestone, Oligocene, Florida: Matson and Clapp, 829.
- Ocheese beds, Oligocene, Florida: Matson and Clapp, 829.
- Octoraro schist, Ordovician, Pennsylvania: Bascom *et al.*, 74, 75.
- Ogalalla formation, Pliocene, Nebraska: Matthew and Cook, 840.
- Ohio shale, Devonian, Kentucky: Matson, 827.
- Ohio shale, Devonian and Mississippian, Kentucky: Morse and Foerste, 887.
- Ohio Creek formation, Tertiary, Colorado: Lee, 743.
- Ojina formation, Mexico: Burrows, 171.
- Oldham limestone, Silurian, Kentucky: Foerste, 409.
- Olentangy shale, Devonian, Ohio: Stauffer, 1096.
- Onondaga limestone, Devonian, New Jersey: Kummel, 682.
- Onondaga limestone, Devonian, New York: Luther, 786.
- Opeche formation, Carboniferous, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Opeche formation, Carboniferous, Wyoming and South Dakota: Darton, 306.
- Orchard Creek shale, Ordovician, Illinois: Savage, 1027.
- Oread limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Oriskany formation, Devonian, New Jersey: Kummel, 682.
- Oriskany formation, Devonian, Pennsylvania: Stose, 1119.
- Oriskany sandstone, Devonian, New York: Luther, 786.
- Osage formation, Mississippian, Missouri: Buckley, 158.
- Osage limestone, Mississippian, Illinois and Missouri: Fenneman, 392.
- Otter shale, Carboniferous, Montana: Fisher, 396.
- Ouachita shale, Ordovician: Purdue, 972.
- Ouay limestone, Devonian, Colorado: Kindle, 666.
- Pahasapa limestone, Carboniferous, South Dakota: Darton, 307.
- Pahasapa limestone, Carboniferous, Wyoming and South Dakota: Darton, 306.
- Paint Lick bed, Ordovician, Kentucky: Foerste, 413.
- Palm Beach limestone, Pleistocene, Florida: Sanford, 1025.
- Pamelia (Stones River) formation, Ordovician, New York and Canada: Clarke, 240.
- Panola formation, Silurian and Devonian, Kentucky: Matson, 827.
- Paonia shale, Cretaceous, Colorado: Lee, 743.
- Paris bed, Ordovician, Kentucky: Foerste, 413.
- Parkman sandstone, Cretaceous, Wyoming: Stanton, 1094.
- Parting quartzite series, Devonian, Colorado: Spurr, 1091.
- Paskapoo, Tertiary, Canada: Dowling, 350.
- Paskapoo formation, Tertiary, Alberta: Dowling, 352.
- Patapsco formation, Cretaceous, New Jersey: Bascom *et al.*, 74.
- Patriot limestone, Carboniferous, Ohio: Condit, 280.
- Pawnee limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Peace Creek bone bed, Pliocene, Florida: Matson and Clapp, 829.
- Pearisburg limestone, Ordovician, Virginia: Bassler, 78.
- Pearl shales, Carboniferous, Kansas: Beede, 90.
- Peninsular limestone, Oligocene, Florida: Matson and Clapp, 829.
- Pennington shale, Mississippian, Virginia: Bassler, 78.
- Pensauken formation, Pleistocene, New Jersey: Kummel, 682.
- Pensauken formation, Quaternary, Delaware, Pennsylvania, and New Jersey: Bascom *et al.*, 74, 75.
- Peorian interglacial epoch, Quaternary, Illinois and Iowa: Carman, 198.
- Peorian interglacial interval, Pleistocene, Iowa: Calvin, 187.
- Pequanac shale, Devonian, New Jersey: Kummel, 682.
- Pierre formation, Cretaceous, Colorado: Henderson, 536.
- Pierre formation, Cretaceous, Montana: Douglass, 348.
- Pierre shale, Cretaceous, Montana: Smith, 1076.
- Pierre shale, Cretaceous, North Dakota: Barry and Melsted, 70; Leonard, 758.
- Pierre shale, Cretaceous, South Dakota: Darton, 307; Darton and O'Harra, 312; Todd, 1146.
- Pierre shale, Cretaceous, Wyoming and South Dakota: Darton, 306.
- Pinal schist, pre-Cambrian, Arizona: Truesdell, 1155.
- Pine Creek limestone, Carboniferous, Pennsylvania: Raymond, 983.
- Piney formation, Cretaceous, Wyoming: Knowlton, 678; Stanton, 1094.
- Pinguico rhyolites, Mexico: Botsford, 129.
- Pittsburg limestone, Carboniferous, Ohio: Condit, 280.
- Pittsburg sandstone, Carboniferous, West Virginia: Hennen, 537.
- Platin formation, Ordovician, Missouri: Buckley, 158.
- Pleasanton formation, Carboniferous, Iowa: Lees, 751.
- Pleasanton shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Plomosas formation, Mexico: Burrows, 171.
- Plum Creek clay, Silurian, Kentucky: Foerste, 409.
- Pochuck gneiss, pre-Cambrian, New Jersey: Kummel, 682.
- Pochuck gneisses, New Jersey: Bayley, 86.
- Point Pleasant beds, Ordovician, Ohio: Foerste, 412, 413.
- Polk Creek shale, Ordovician, Arkansas: Purdue, 972, 973.
- Portage formation, Devonian, New York: Williams, 1254.

- Portage shales, Devonian, Pennsylvania: Stose, 1119.
- Port Ewen (Kingston) beds, Devonian, New Jersey: Kümme1, 682.
- Potomac group, Cretaceous, New Jersey: Bascom *et al.*, 74, 75.
- Potosi formation, Cambrian, Missouri: Buckley, 158.
- Pottawatomie stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Pottsville formation, Carboniferous, Ohio: Carney, 200.
- Poughquag quartzite, New York: Clarke, 240.
- Poxino Island shale, Silurian, New Jersey: Kümme1, 682.
- Pozo formation, Tertiary, Nevada: Ransome, 976.
- Pre-Kansan drift, Pleistocene, Iowa: Calvin, 187.
- Prichard formation, Algonkian, Idaho and Montana: Calkins, 181.
- Proctor formation, Cambrian, Missouri: Buckley, 158.
- Proctor sandstones, Carboniferous, West Virginia: Hennen, 537.
- Prout limestone, Devonian, Ohio: Stauffer, 1096.
- Providence sand, Cretaceous, Georgia: Veatch, 1184.
- Pulaski beds, Tertiary, Oregon: Dall, 300.
- Purissima formation, Miocene, California: Branner *et al.*, 138.
- Put in Bay dolomites, Silurian, Ohio: Lane *et al.*, 733; Sherzer and Grabau, 1058.
- Quadrant formation, Carboniferous, Montana: Fisher, 396, 397.
- Quadrant formation, Pennsylvanian?, Montana: Calvert, 185.
- Quercan sandstone, Tertiary, California: Weaver, 1212.
- Quillayute formation, Pliocene, Washington: Reagan, 989.
- Quinalet formation, Pliocene, Washington: Reagan, 989.
- Rabbit Spring formation, Tertiary, Nevada: Ransome, 976.
- Raft River formation, Pliocene, Washington: Reagan, 989.
- Raisin River dolomites, Silurian, Ohio and Michigan: Lane *et al.*, 733; Sherzer and Grabau, 1058.
- Rancocas group, Cretaceous, New Jersey: Bascom *et al.*, 74, 75.
- Raritan formation, Cretaceous, New Jersey: Bascom *et al.*, 74, 75; Kümme1, 682.
- Ravalli group, Algonkian, Idaho and Montana: Calkins, 181.
- Ravenswood granodiorite, New York: Berkey, 101.
- Red Bank sand, Cretaceous, New Jersey: Bascom *et al.*, 75.
- Red Bank sand, Cretaceous, New Jersey: Kümme1, 682.
- Redstone limestone, Carboniferous, West Virginia: Hennen, 537.
- Renfroes marl, Cretaceous, Georgia: Veatch, 1184.
- Revett formation, Algonkian, Idaho and Montana: Calkins, 181.
- Rhinestreet shale, Devonian, New York: Luther, 786.
- Richmond formation, Ordovician, Kentucky: Matson, 827.
- Ripley formation, Cretaceous, Georgia: Veatch, 1184.
- Riverside. *See* Knob sandstone.
- Roan gneiss, Archean, North and South Carolina: Pratt and Sterrett, 968.
- Rockford (Goniatite) limestone, Mississippian, Kentucky: Bassler, 80.
- Rockmart slate, Silurian, Georgia: Veatch, 1184.
- Rockwood formation, Silurian, Georgia: Veatch, 1184.
- Rogersville shale, Cambrian, Virginia: Bassler, 78.
- Rollins sandstone, Cretaceous, Colorado: Lee, 743.
- Rome formation, Cambrian, Georgia: Veatch, 1184.
- Romney or Chattanooga shale, Devonian, Virginia: Bassler, 78.
- Romney shales, Devonian, Pennsylvania: Stose, 1119.
- Rondout limestone, Silurian, New Jersey: Kümme1, 682.
- Rondout waterlime, Silurian, New York: Luther, 786.
- Roubidoux formation, Cambrian, Missouri: Buckley, 158.
- Ruby formation, Tertiary, Colorado: Lee, 743.
- Rush Run sandstone, Carboniferous, West Virginia: Hennen, 537.
- Russell formation, Cambrian, Virginia: Bassler, 78.
- Rutledge limestone, Cambrian, Virginia: Bassler, 78.
- Sabine stage, Eocene, Louisiana and Texas: Harris, 512.
- St. Genevieve formation, Mississippian, Missouri: Buckley, 158.
- St. Joe marble, Mississippian, Arkansas: Weller, 1218.
- St. Louis formation, Mississippian, Missouri: Buckley, 158.
- St. Louis limestone, Mississippian, Illinois and Missouri: Fenneman, 392.
- St. Regis formation, Algonkian, Idaho and Montana: Calkins, 181.
- St. Peter sandstone, Ordovician, Kentucky: Matson, 827.
- St. Peters formation, Ordovician, Missouri: Buckley, 158.
- Sage Creek white layer, Eocene, Wyoming: Matthew, 834.
- Saginaw formation, Carboniferous, Michigan: Cooper, 285.
- Salinan, Silurian: Grabau, 472.
- Salt Fork stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Saluda bed, Ordovician, Indiana and Kentucky: Foerste, 413.
- San Andreas limestone, Pennsylvanian, New Mexico: Lee, 745.
- Sandia formation, Pennsylvanian, New Mexico: Lee, 745.
- Sandstorm rhyolite, Tertiary, Nevada: Ransome, 976.
- Sangamon interglacial epoch, Quaternary, Illinois and Iowa: Carman, 198.
- Sangamon interglacial interval, Pleistocene, Iowa and Illinois: Calvin, 187.
- San Lorenzo formation, Oligocene, California: Branner *et al.*, 138.

- San Pablo formation, Tertiary, California: Weaver, 1212.
- Santa Fe granite, Colorado: Patton, 943.
- Santa Margarita formation, California: Johnson, 631.
- Santa Margarita formation, Miocene, California: Branner *et al.*, 138.
- Santa Margarita? formation, Miocene, California: Arnold, 30.
- Satanka shale, Carboniferous, Wyoming: Darton and Siebenthal, 313.
- Saxicava sand, Pleistocene, Ontario: Coleman, 269.
- Scarboro beds, Pleistocene, Ontario: Coleman, 269.
- Scranton shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Sellersburg formation, Devonian, Kentucky: Bassler, 80.
- Senecan, Devonian, New York: Luther, 786.
- Sentinel Butte group of lignite beds, Eocene, North Dakota: Leonard and Smith, 761.
- Severy shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Sevier shale, Ordovician, Virginia: Bassler, 78.
- Sewickley sandstone, Carboniferous, West Virginia: Hennen, 537.
- Sexton Creek limestone, Silurian, Illinois and Missouri: Savage, 1027.
- Shady (Sherwood-Tomstown) limestone, Cambro-Ordovician, Virginia: Bassler, 78.
- Shark River marl, Eocene, New Jersey: Kümmel, 682.
- Sharon member, Carboniferous, Ohio: Carney, 200.
- Shawangunk conglomerate, Silurian, New Jersey: Kümmel, 682.
- Shawangunk conglomerate, Silurian, Pennsylvania: Grabau, 476.
- Shawnee stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Sheep Creek beds, Miocene, Nebraska: Matthew and Cook, 840.
- Shenandoah group, Cambro-Ordovician, Virginia: Bassler, 78.
- Shenandoah limestone, Cambro-Ordovician, Pennsylvania: Bascom *et al.*, 74, 75.
- Sherburne flagstone member, Devonian, New York: Williams, 1254.
- Shoal River marl member, Oligocene, Florida: Matson and Clapp, 829.
- Shoshone group, Cretaceous, Rocky Mountain region: Cross, 294.
- Siebert formation, Tertiary, Nevada: Ransome, 976.
- Silver Creek hydraulic limestone, Devonian, Kentucky: Bassler, 80.
- Skaneateles shale, Devonian, New York: Luther, 786.
- Skunnemunk conglomerate, Devonian, New Jersey: Kümmel, 682.
- Slatington shale, Ordovician, Arkansas: Purdue, 973.
- Snake Creek beds, Pliocene, Nebraska: Matthew and Cook, 840.
- Sopchoppy limestone, Oligocene, Florida: Matson and Clapp, 829.
- Spearfish formation, Triassic, South Dakota: Darton and O'Harra, 312.
- Spearfish formation, Triassic?, South Dakota, Darton, 307.
- Spearfish formation, Triassic?, Wyoming and South Dakota: Darton, 306.
- Spearhead rhyolite, Tertiary, Nevada: Ransome, 976.
- Spergen, Mississippian, Missouri: Buckley, 158.
- Spergen limestone, Mississippian, Illinois and Missouri: Fenneman, 392.
- Spoon Butte beds, Tertiary, Nebraska: Peterson, 951.
- Standley shale, Carboniferous, Oklahoma: Taff, 1130.
- Stanley shale, Carboniferous, Arkansas: Purdue, 972.
- Stanton limestone, Carboniferous, Kansas: Haworth and Bennett, 518.
- Stockton beds, Triassic, New Jersey: Kümmel, 682.
- Stockton formation, Triassic, Pennsylvania: Bascom *et al.*, 74, 75.
- Stonehouse formation, Silurian, Nova Scotia: Twenhofel, 1158.
- Stones River formation, Ordovician, Virginia: Bassler, 78.
- Stones River limestone, Ordovician, Pennsylvania: Stose, 1119.
- Stormville sandstone, Devonian, New Jersey: Kümmel, 682.
- Stringtown shale, Ordovician, Arkansas: Purdue, 972.
- Striped Peak formation, Algonkian, Idaho and Montana: Calkins, 181.
- Sub-Aftonian drift, Pleistocene, Iowa: Calvin, 187.
- Sulphur Springs formation, Devonian, Missouri: Buckley, 158.
- Sumner stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Sunbury formation, Carboniferous, Ohio: Carney, 200.
- Sunbury shale, Mississippian, Ohio and Kentucky: Morse and Foerste, 887.
- Sundance formation, Jurassic, Colorado: Henderson, 536.
- Sundance formation, Jurassic, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Sundance formation, Jurassic, Wyoming: Darton and Siebenthal, 313.
- Sundance formation, Jurassic, Wyoming and South Dakota: Darton, 306.
- Sylvania sandstone, Silurian, Michigan: Lane *et al.*, 733.
- Sylvania sandstone, Silurian, Michigan and adjacent: Sherzer and Grabau, 1058.
- Tampa formation, Oligocene, Florida: Matson and Clapp, 829.
- Taylor formation, Cretaceous, Texas: Gordon, 465.
- Taylor sandstone, Carboniferous, West Virginia: Hennen, 537.
- Tecumseh shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Tejon formation, Eocene, California: Arnold, 30; Johnson, 631.
- Thebes sandstone, Ordovician, Illinois: Savage, 1027.
- Tichenor limestone, Devonian, New York: Luther, 786.
- Tinton bed, Cretaceous, New Jersey: Kümmel, 682.
- Tishomingo granite, Oklahoma: Taff and Reed, 1132.

- Tomstown limestone, Cambrian, Pennsylvania: Stose, 1119.
- Topeka limestones, Carboniferous, Kansas: Haworth and Bennett, 518.
- Toronto formation, Pleistocene, Ontario: Coleman, 269.
- Trenton formation, Ordovician, New York: Miller, 867.
- Trenton limestone, Ordovician, New York: Miller, 867.
- Trentonian, Ordovician: Grabau, 472.
- Tribune formation, Mississippian, Missouri: Buckley, 158.
- Trinity sand, Cretaceous, Oklahoma: Taff and Reed, 1132.
- Truckee formation, Tertiary, Nevada: Anderson, 25.
- Tulare formation, Pliocene-Pleistocene, California: Arnold, 30.
- Tully limestone, Devonian, New York: Luther, 786.
- Tunnel Point beds, Tertiary, Oregon: Dall, 300.
- Tuscaloosa formation, Cretaceous, Georgia: Veatch, 1184.
- Tuscarora sandstone, Silurian, Pennsylvania: Grabau, 476; Stose, 1119.
- Tymochtee shales and limestones, Silurian, Ohio: Lane *et al.*, 733.
- Tyrone beds, Ordovician, Pennsylvania: Grabau, 472.
- Ulsterian, Devonian, New York: Luther, 786.
- Uniontown sandstone, Carboniferous, West Virginia: Hennen, 537.
- Unicoi sandstone, Cambrian, Virginia: Bassler, 78.
- Unkpapa sandstone, Jurassic, South Dakota: Darton, 307; Darton and O'Harra, 312.
- Unkpapa sandstone, Jurassic, Wyoming and South Dakota: Darton, 306.
- Utica shale, Ordovician: Grabau, 472.
- Utica shale formation, Ordovician, New York: Miller, 867.
- Vancouver series, Triassic, British Columbia: Clapp, 228.
- Vaqueros formation, Miocene, California: Arnold, 30; Branner *et al.*, 138; Johnson, 631.
- Vicksburg group, Oligocene, Florida: Matson and Clapp, 829.
- Vicksburg stage, Oligocene, Louisiana and Texas: Harris, 512.
- Vicksburg-Jackson formation, Tertiary, Georgia: Veatch, 1184.
- Victoria series, Devonian, British Columbia: Clapp, 228.
- Vilas shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Vincetown sand, Cretaceous, New Jersey: Bascom *et al.*, 74, 75; Kümmel, 682.
- Vindicator rhyolite, Tertiary, Nevada: Ransome, 976.
- Wabauensee stage, Carboniferous, Kansas: Haworth and Bennett, 518.
- Waco limestone, Silurian, Kentucky: Foerste, 409.
- Wagonwheel formation, Oligocene?, California: Johnson, 631.
- Walden sandstone, Carboniferous, Georgia: Veatch, 1184.
- Waldo formation, Oligocene, Florida: Matson and Clapp, 829.
- Waldron shale, Silurian, Indiana: Kindle and Barnett, 670.
- Walnut shales, Carboniferous, Kansas: Haworth and Bennett, 518.
- Wappinger limestone, New York: Clarke, 240.
- Warren gravels, Pleistocene, Ontario: Coleman, 269.
- Warsaw formation, Mississippian, Illinois and Missouri: Fenneman, 392.
- Warsaw formation, Mississippian, Missouri: Buckley, 158.
- Wasatch formation, Tertiary, Colorado: Gale, 433.
- Wasatch formation, Tertiary, Wyoming: Schultz, 1039; Smith, 1077; Washburne, 1204.
- Washakie formation, Tertiary, Wyoming: Granger, 482; Sinclair, 1065.
- Washington limestones, Carboniferous, West Virginia: Hennen, 537.
- Washington sandstone, Carboniferous, West Virginia: Hennen, 537.
- Wautaga (Buena Vista) shale, Cambrian, Virginia: Bassler, 78.
- Wautaga (Waynesboro-Buena Vista) formation, Cambro-Ordovician, Virginia: Bassler, 78.
- Waverly formation, Mississippian, Ohio and Kentucky: Morse and Foerste, 887.
- Waverly shale, Carboniferous, Kentucky: Matson, 827.
- Waynesboro formation, Cambrian, Pennsylvania: Stose, 1119.
- Waynesburg limestone, Carboniferous, West Virginia: Hennen, 537.
- Waynesville bed, Ordovician, Ohio: Foerste, 413.
- Weber formation, Carboniferous, Colorado: Spurr, 1091.
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